

AD-A069 039

KOLLSMAN INSTRUMENT CO MERRIMACK NH

F/G 1/4

REPORT OF INVESTIGATION OF ALTIMETERS RETURNED FROM NWSC, CRANE--ETC(U)

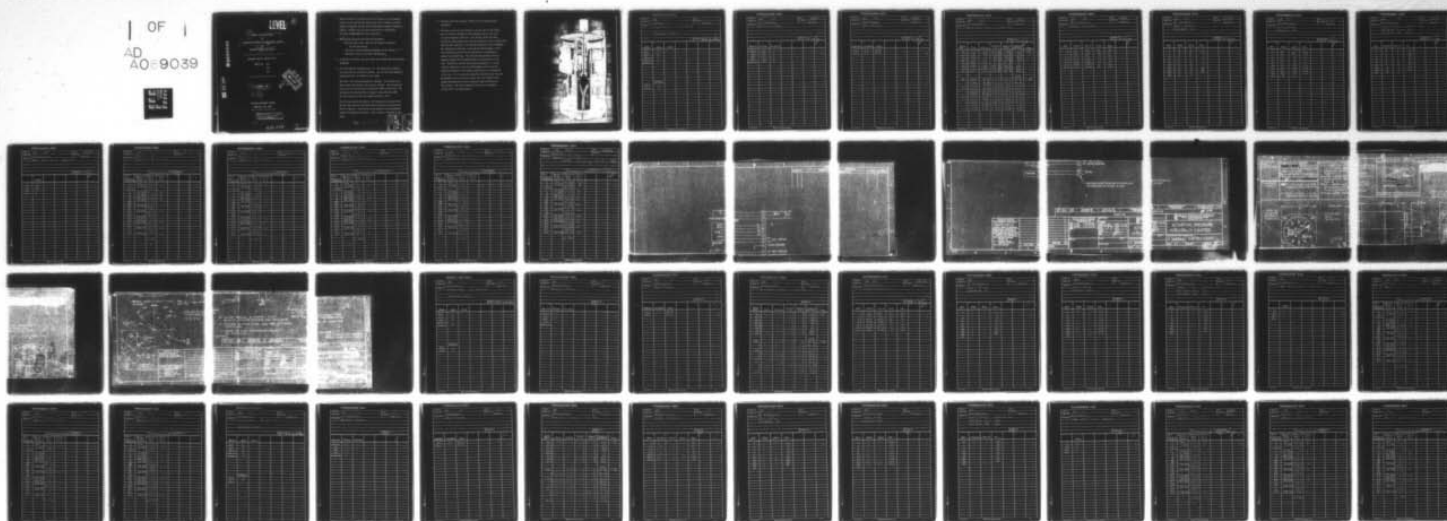
N00164-75-C-0279

NOV 76

NL

UNCLASSIFIED

OF
AD
AO-9039



LEVEL

(4)

(6)

REPORT OF INVESTIGATION
OF

ALTIMETERS RETURNED FROM NWSC CRANE, INDIANA.

(15) ON

CONTRACT: N00164-75-C-0279

KOLLSMAN TYPE NO. A45782 10 001

SERIAL NO. 103

105

106

(11)

NOVEMBER 1976

(12) 51p.

DDC
RECEIVED
MAY 16 1978
C

KOLLSMAN INSTRUMENT COMPANY

MERRIMACK, NH 03054

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for public release and sale; its
distribution is unlimited.

79 04 09 02

411 186

LB

Enclosure (2)

ADA069039

DDC FILE COPY

1. Contract N00164-75-C-0279 called for the delivery of six altimeters similar to the type AAU-32/A except they were to contain a resolver output of indicated altitude and a potentiometer output of barometric setting. The six units were built and tested as required and delivered to ~~NWSC Crane~~ for their evaluation.)
2. NWSC testing indicated three units had problems;
 #103 had scale error -35°C out of tolerance conditions at nine test points,
 #105 had a reversed phasing arrangement on the resolver, and
 #106 had a seizure of the baro setting knob.
3. At receipt at Kollsman, the three units were retested for the functions designated.
4. Unit #103 required recompensation; i.e., the thermostatic bimetals were reset and the calibration checked. The unit has been completely retested and data is attached to this report.

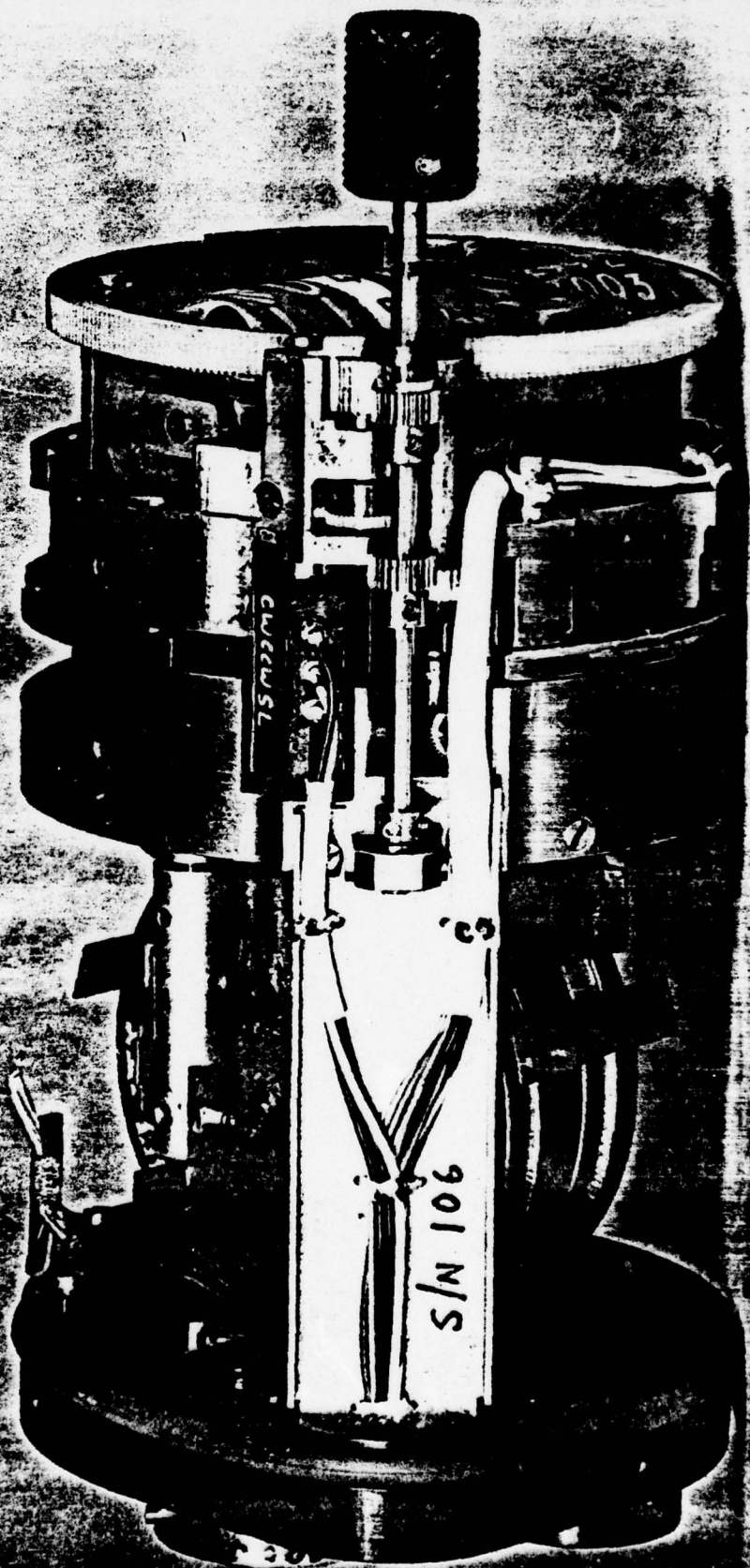
Unit #105 - The reversed phasing was confirmed. The resolver excitation leads were reversed, and the unit retested. The resolver had the lead colors reversed and a conventional VTVM had been used. The testing has now been modified to require a phase-sensitive VTVM for that testing, so that this problem should not recur.

Unit #106 was opened and checked. The bearing for the lower end of the knob shaft had not been lubricated and had thus seized the knob shaft as reported. This portion of the altimeter was disassembled, reworked and completely retested. The test data is attached to this report.

79 04 09 02

COESION for	White Section	<input checked="" type="checkbox"/>
	Buff Section	<input type="checkbox"/>
UNANNOUNCED	P. R. St.	
JUSTIFICATION	D. R. St.	
DISTRIBUTION/AVAILABILITY CODES		
SPECIAL		
A 23		

5. The units have been returned to NWSC for their evaluation and acceptance.
6. The sump on the case was extended to the rear face of the instrument to allow for assembly of the mechanism into the case with all parts completely installed. This design liberty was taken because the added length above the amount specified in Mil-A-81851 (AS) made the unit identical to the AAU-32/A specified in Mil-A-81852(AS). The installation provisions of the AAU-32/A had undergone a fleet-wide installation survey and the specification was amended to permit the extended sump. This installation procedure permits a complete checkout of the mechanism prior to installation in the case. With both a resolver and a baro potentiometer, it is particularly important to have the relationship of the electrical elements correlated to the display elements prior to installation in the case. It is also worth noting that the static port was also positioned as for the AAU-32/A because the 4.750 length of case showed some problems of static connections upon installation in the aircraft. The outline drawing of the unit is included to clarify both of the above points.



PERFORMANCE DATA

Subject	S/N 127	Date	10/6
Type No.	A 45983.10001	Job No.	100127
Remarks	EXAMINATION OF PRODUCT		
LIGHTING TEST			
		Signature	R. M. Doolittle
PART	ACC.	RET.	
DIAL	✓		
CASE	✓		
POINTERS	✓		
STATIC PORT	✓		
CONNECTOR	✓		
<u>LIGHTING</u>			
RED	✓		
WHITE	✓		

PERFORMANCE DATA

Subject	S/N 103	Date	11/8/76
Type No.	A 4578210001	Job No.	100127
Remarks	POSITION ERROR		
		Signature	H. Chung

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

Subject		S/N		103		Date		11/3/76	
Type No.		A 4578210001				Job No.		100127	
Remarks									
BARO SCALF FABOR. + BARO POT									
						Signature			
						G. Chung			
TEST POINT	C.W.	C.C.W.	CORRECTED C.W.		CORRECTED C.C.W.		CORRECT DIFFERENCE		TOL.
28.1	-1295	-1295	-1720	-7	-1720	-7	-1,727	± 25	
28.5	-920	-920	-1345	+5	-1345	+5	-1,340		
29.0	-430	-430	-855	-8	-855	-8	-863		
29.5	+25	+30	-400	+8	-395	+3	-392		
29.72	+425	+430	0	0	+5	+5	0		
30.5	+950	+950	+525	-6	+525	-6	531		
30.9	+1320	+1320	+895	+2	+895	+2	893		
31.0	+1415	+1415	+990	+7	+990	+7	983		
							V/R		
28.1	90.942	90.945	+0.042		+0.043		90.90	± .83	
.4	81.229	81.224	+0.109		+0.114		81.12		
.7	71.655	71.673	+0.025		+0.043		71.63		
29.0	62.173	62.147	+0.075		+0.047		62.10		
.2	52.708	52.723	+0.078		+0.093		52.63		
.6	43.384	43.381	+0.114		+0.111		43.27		
29.72	33.459	33.445	+0.129		+0.115		33.33		
30.0	30.993	30.993	+0.093		+0.093		30.90		
.3	21.744	21.743	+0.014		+0.013		21.73		
.6	12.557	12.568	-0.043		-0.032		12.60		
.9	3.464	3.445	-0.106		-0.125		3.57		
31.0	0.605	0.605	+0.035		+0.035		0.57		

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

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[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

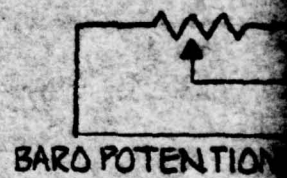
[illegible]

PERFORMANCE DATA

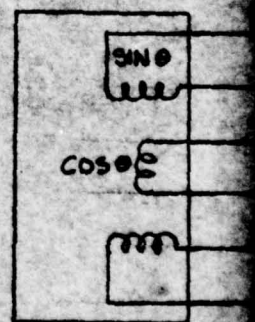
Subject		SN 105		Date	12/6/76
Type No.		A45782 15 001		Job No.	
Remarks Altitude Scale Error After Repeating Resolution Note					
Temperature +25°C				Signature [Signature]	
Test Altitude 1000 ft	Resolver Bridge Setting	Altimeter Scale Error feet	Resolver Error feet		
-1	0.0	0 / +5	-5		
0	7.031	0 / +5	0		
+0.5		0 / +5			
1	14.063	-5 / 0	0		
2	21.094	0 / +5	0		
3	28.125	0 / +5	0		
5	42.187	+20 / +35	+5		
8		+15 / +25			
10	77.344	0 / +10	+15		
12		0 / +10			
15	112.500	-10 / 0	+30		
18		-25 / -15			
20	147.656	-15 / 0	+20		
25	182.813	-40 / -20	+5		
30	217.969	-35 / -25	0		
35		+15 / +25			
40	288.281	+45 / +50	+5		
45		-35 / -25			
50	358.594	-10 / -145	-5		
		V _p / Down			

D

C



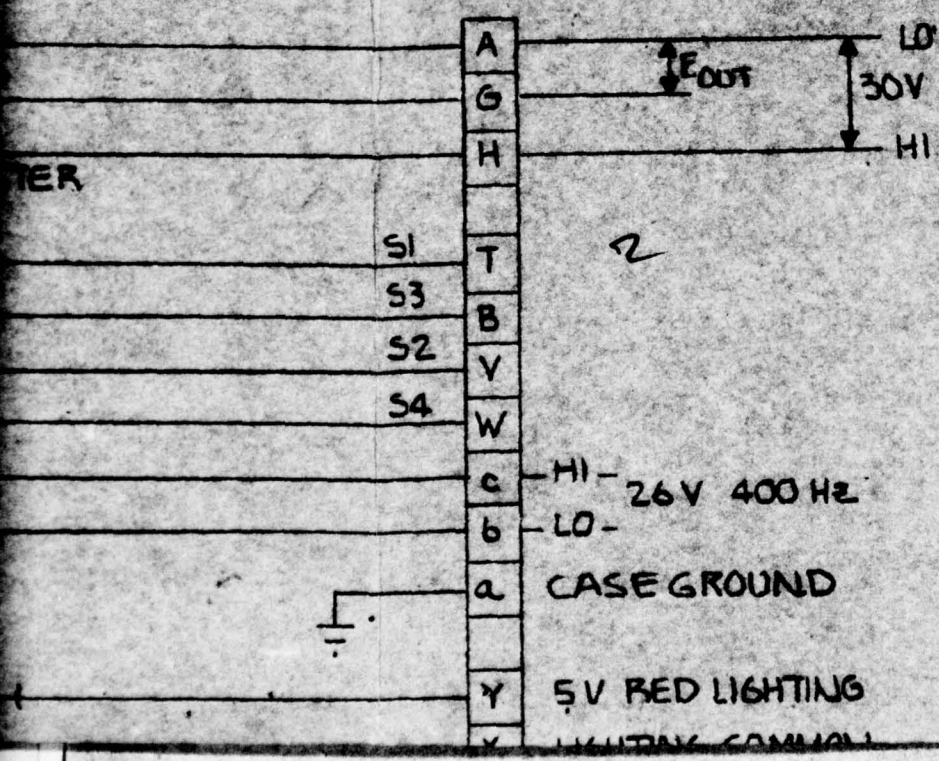
BARO POTENTIOMETER



RESOLVER



ZONE	LTR	DESCRIPTION



1

REVISIONS

DESCRIPTION

DATE

APPROVED

D

3



VIBRATOR

GENERAL NOTES			
FOR GENERAL MACHINING STANDARDS REFER TO LATEST ISSUE OF KES-2A.2			
PARENTHETICAL IDENTITIES OF SYMBOLS, DWG. AND DOCUMENT NOS. ARE FOR KOLLSMAN USE ONLY.			
PARTS LIST SYMBOLS			
CD = SEE SPEC OR SOURCE CONTROL DWG PL = ASSEMBLY DWG SEE ASSOCIATED PARTS LIST BM = BULK MATERIAL			
		NEXT ASSY	
			APP

B

A

10 0462

4

3

TS

A	LIGHTING COMMON
Z	5V WHITE LIGHTING
M	- 28VDC
P	+ 28VDC

— ELECTRICAL RECEPTACLE MS 3113H 16C 26P
TO MATE WITH MS 3116E-16-265

5

FIND NO.	QTY REQ.	CODE IDENT	DRAWING OR DOCUMENT NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE DESCRIPTION
----------	----------	------------	-------------------------	-----------------------------	--------------------------

PARTS LIST

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				CONTRACT		KOB R
		TOLERANCES ON				RELEASE DATE		
2 PL DEC 2-2	± .02 ± .	FRAC.		± 1/64 ±	DWN J. Badley	DATE 3/24/76		


MS 3113H 16C 26P
E-16-265

B

NO.	NOMENCLATURE OR DESCRIPTION	KOLLSMAN PART NO. REFERENCE ONLY	SYM
-----	-----------------------------	----------------------------------	-----

PARTS LIST

DEC 7 1976

 **Kollsman Instrument Company**
Division of Sun Chemical Corporation
Syosset, New York

DATE 3/26/76
DATE
DATE
PRODUCT

ALTIMETER, PRESSURE
INTEGRALLY LIGHTED

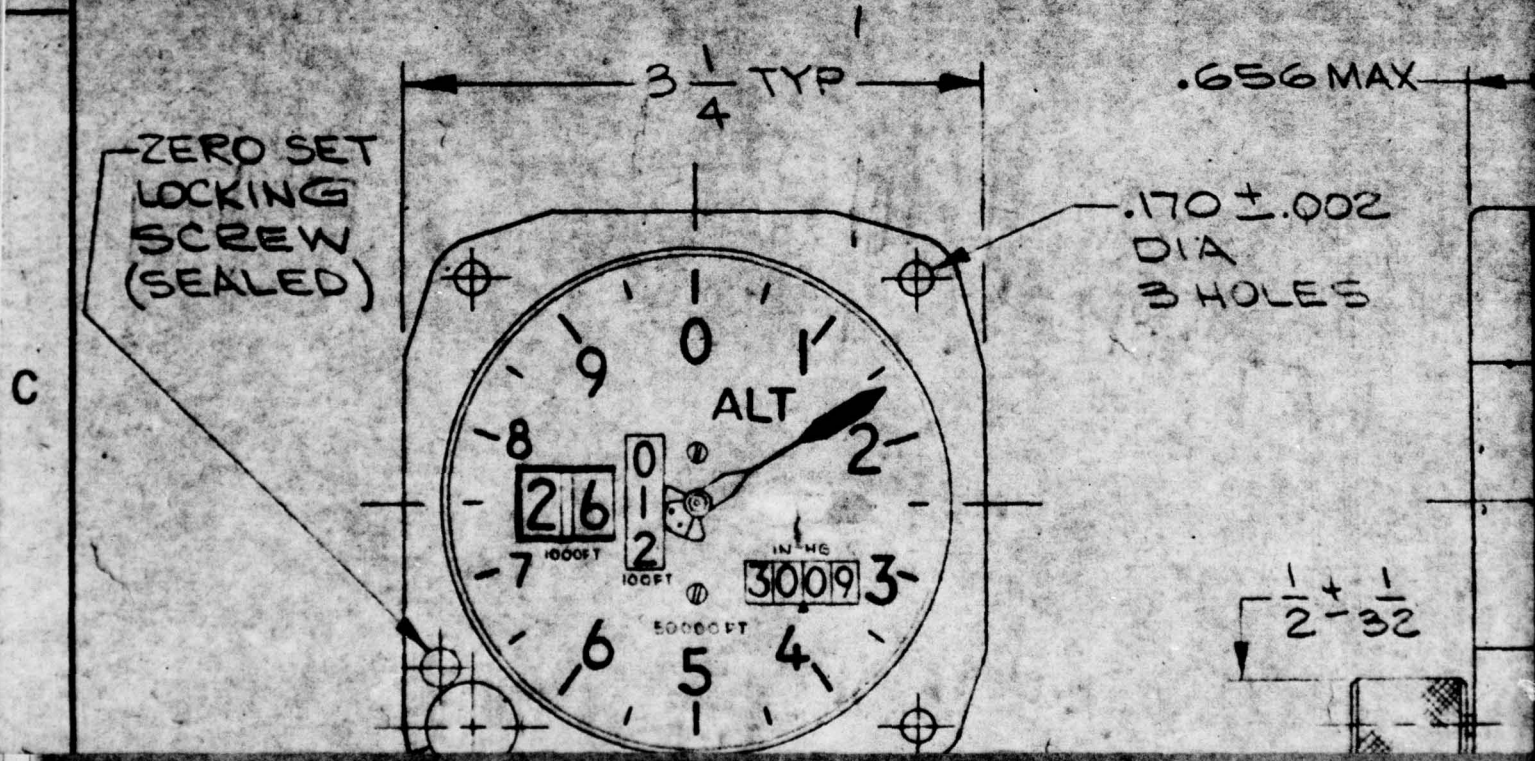
A

DATE	SIZE	CODE IDENT NO.	DWG NO.
	C	89944	A45782100001
	SCALE ~	WEIGHT	SHEET

4

3

<p>DIAL FINISH</p>	<p>MARKINGS: EXCEPT 50000 FT FLAT WHITE, COLOR 37875, FED STD 595 BACKGROUND: FLAT BLACK COLOR 37038, FED STD 595 & 50000 FT BLACK</p>	<p>ELECTRICAL DATA VIBRATOR INPUT - DC POWER, PER CATEGORY B 28V PIN P (+) WHITE LIGHTING 5 VOLTS AC OR PIN Z</p>
<p>POINTER FINISH</p>	<p>■ FLAT WHITE, COLOR 37875, FED. STD 595 □ FLAT BLACK, COLOR 37038, FED. STD 595</p>	<p>RED LIGHTING 5 VOLTS AC PIN X, PIN Y PIN (Q) CASE GRO</p>



MIL STD 704
DC PIN M (2)

INPUT-
DC PIX X,

INPUT-
R DC

UND

ALTIMETER-PRESSURE

INTEGRALLY LIGHTED
RANGE -1000 TO +50000 FEET
PR CODE/PT NO 89944-
SERIAL NO

CONTR NO
KOLLSMAN INSTRUMENT COMPANY
MERRIMACK N.H.

WEIGHT 2.5 LBS MAX(CALC)

ELECTRICAL RECE
TO MATE WI
MS3116-16

4.750 MAX

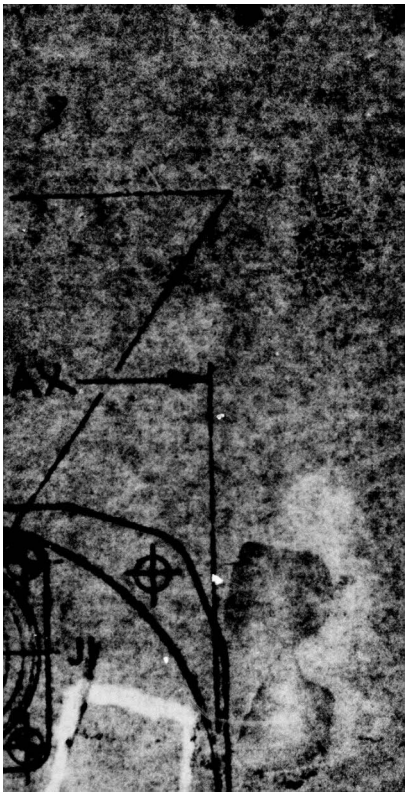
$\frac{3}{4}$ MAX

$\frac{7}{8}$ DIA

$\frac{1}{8}$ DIA

STATIC

STATIC



BARO ZERO SETTING.
KNOB

$$\frac{45}{64} + \frac{1}{32}$$

45°

45°

DR NO 18 (.10
3 HOLES O
3 1/2 DIA

11/64 RAD
TYP

51/64

3/64 RAD
TYP

3 5/32

1 41/64

1 41/64

1 19/32

35/64
RAD

PANEL
CUTOUT
PER MS33549

GENERAL NOTES

PARENTICAL IDENTITIES OF
SYMBOLS, DWG. AND DOCUMENT
NOS. ARE FOR KOLLSMAN USE ONLY.

PARTS LIST SYMBOLS

CD = SEE SPEC OR SOURCE
CONTROL DWG
PL = ASSEMBLY DWG SEE
ASSOCIATED PARTS LIST
BM = BULK MATERIAL

NEXT ASSY

21
32
MAX

STATIC C
IN A/W
REF 9/16

3- CASE, BEZEL & KNOB: FLAT
BLACK, COLOR 37038 FED. STD 595.

2- COVER GLASS HAS LOW REFLECTANCE
COATING

1- CASE IN A/W MS33549, EXCEPT
AS SHOWN.

NOTES

FIND NO.	QTY REQ.	CODE IDENT	DRAWING OR DOCUMENT NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE DESCRIPTION
PARTS LIST					

CONNECTION

MS 33649-6

6-18 UNJF-38

RANGE:-

ALT - 1000 TO + 5000 FT

BARO - 25.1 TO 31.0 IN HG

FEATURE OR
DESCRIPTION

HOLLAND PART NO.
REFERENCE ONLY

SYM

LOCATION

DATE

BY

REMARKS

REMARKS

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible][illegible]

PERFORMANCE DATA

Subject	S/N 105	Date	11/12
Type No.	A 4578210001	Job No.	100127
Remarks	ZERO SCALE ERROR + ZERO PLOT		
Signature <i>[Signature]</i>			

TEST POINT	C.W.	C.C.W.	CORRECTED C.W.	CORRECTED C.C.W.	CORRECT DIFFERENCE	TOL
28.1	-1175	-1185	-1180	-1175	-2	± 25
28.5	-1245	-1255	-1250	-1245	-5	"
29.0	-810	-820	-810	-810	0	
29.5	-310	-320	-310	-310	0	
29.92	0	0	0	0	0	
30.5	+530	+540	+540	+535	-5	
30.9	+895	+900	+900	+895	-5	
31.0	+980	+990	+990	+980	-10	
					V/R	
28.1	90.924	90.935	+0.024	+0.024		± .83
.4	81.203	81.220	+0.033	+0.033		
.7	71.544	71.544	-0.001	-0.001		
29.0	62.091	62.091	-0.019	-0.011		
.3	52.617	52.643	-0.013	-0.013		
.6	43.327	43.364	+0.037	+0.034		
29.92	33.337	33.422	+0.085	+0.082		
30.0	24.045	24.095	+0.045	+0.045		
.3	21.908	21.785	-0.078	-0.055		
.6	12.627	12.649	+0.027	+0.048		
.9	3.513	3.483	-0.052	-0.051		
31.0	0.613	0.613	+0.047	+0.043		

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

Subject	S/N 105	Date	11/12
Type No.	A 4578210001	Job No.	100127
Remarks	STOP + JUMP VIBRATOR ON 45° DIAL DOWN INC 45° DIAL UP DEC		
		Signature	

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

Subject	S/N 106	Date	11/12
Type No.	A-4578210001	Job No.	100127
Remarks	Bare Tarone		
		Signature	[Signature]

[illegible]

PERFORMANCE DATA

Subject		S/N 106		Date 11/12		
Type No.		A 1578210001		Job No. 100127		
Remarks DARK SOLID ERROR + DARK POT						
Signature (100)						
TEST POINT	C.W.	C.C.W.	CORRECTED C.W.	CORRECTED C.C.W.	CORRECT DIFFERENCE	TOL
28.1	-1645	-1650	-1725	-1730	-1,727	± 25
28.5	-1260	-1260	-1340	-1340	-1,340	±
29.0	-785	-785	-865	-865	-863	
29.5	-310	-310	-390	-390	-392	
29.92	+50	+50	0	0	0	
30.5	+610	+610	+530	+530	531	
30.9	+895	+895	+895	+895	893	
31.0	+985	+985	+985	+985	983	
V/R						
28.1	90.910	90.914	+1.020	+1.014	90.90	± .83
.4	81.217	81.215	+1.077	+1.075	81.12	
.7	71.651	71.626	+1.021	+1.014	71.63	
29.0	62.168	62.132	+1.038	+1.032	62.10	
.3	52.745	52.720	+1.115	+1.090	52.63	
.6	43.583	43.566	+1.013	+1.001	43.27	
29.92	33.421	33.492	+1.071	+1.066	33.33	
30.0	31.006	31.021	+1.016	+1.011	30.90	
.3	21.809	21.790	+1.079	+1.060	21.73	
.6	12.656	12.652	+1.036	+1.036	12.60	
.9	3.585	3.548	+1.037	+1.042	3.57	
31.0	0.593	0.594	+1.015	+1.014	0.57	

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

Subject	S/N 101	Date	11/2
Type No.	A 45782/0001	Job No.	100127
Remarks	STOP * JUMP VIBRATOR ON		
			Signature

[illegible]

PERFORMANCE DATA

Subject	S/N 106	Date	11/12
Type No.	A 45782/0001	Job No.	100127
Remarks	STOP + JUMP VIBRATOR OFF		
		Signature	(SK) [Signature]

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

[illegible]

PERFORMANCE DATA

Subject SN 106		Date 11/12	
Type No. A45782 15 001		Job No.	
Remarks Altitude Seal-Error			
Temperature +25°C			
		Signature J. Chant	
Test Altitude 1000 ft	Resolver Bridge Setting	Altimeter Scale Error feet	Resolver Error feet
-1	0.0	-5/-5	0
0	7.031	0/0	0
+0.5		0/0	
11	14.063	0/+5	+5
2	21.094	+5/+15	+5
3	28.125	+10/+20	+5
5	42.187	+15/+20	+10
8		+5/+10	
10	77.344	-15/-5	-15
12		-10/0	
15	112.500	-20/-10	-5
18		-50/-40	
20	147.656	-50/-40	-20
25	182.813	-75/-55	-5
30	217.969	-101/-60	-5
35		-70/-10	
40	288.281	0/+20	1
45		-45/-40	
50	358.594	-240/-225	+5
		Up / Down	
	One foot	30'	